

Management Plan for Utah Rocky Mountain Goat

The Rocky Mountain goat (Oreamnos americanus) is one of the most enigmatic and little known wildlife species in Utah. Mountain goat habitat is restricted to the highest and most rugged reaches of our loftiest mountain ranges. Even during winter, goat habitat typically consists of ledges and cliffs well above the elevation of other ungulates.

I. History

The past status of mountain goats in Utah is the subject of some controversy. An analysis of available data is included as an appendix to this document (Appendix I). That position in summary states that suitable mountain goat habitat currently exists within the state, as indicated by the success of introduced populations. Mountain goats are a valuable addition to our wildlife resource diversity. They deserve to be considered a legitimate part of our modern Utah faunal landscape. As with any other ungulate species in our now pervasively human-altered ecosystem, they require some level of pro-active management.

II. Current Status:

Mountain goats currently inhabit several mountain ranges in Utah (Appendix II). All are the result of introductions since 1967. Population sizes vary from the Lone Peak area in Salt Lake County, where as many as 200 goats may be present, to Willard Peak in Box Elder County where six goats were introduced in 1994. During 1996, hunting of mountain goats will be allowed on six of the eight populations. Permits have been issued for any adult goat, given the difficulty in differentiating between sexes under field conditions. Demand for permits is extremely high, with a total of 2800 applicants for the 10 permits issued in 1994.

III. Natural History:

Mountain goats are obligate occupants of the highest alpine environments in Utah. Elevations of up to 13,000 feet are frequented in the summer. Even winter habitat may be at as much as 11,000 feet on windblown ridges. Exposed, precipitous cliffs are an essential component of all mountain goat habitats. These sites are utilized as escape cover, feeding sites, and birthing and nursery areas.

Food habits of goats are extremely variable among different geographic populations. In general, summer diets are typically dominated by succulent grasses and forbs. Winter diets may include a much higher browse or shrub component, and may even include Ponderosa pine, lodge pole pine or alpine fir. Other components of goat habitat that may be locally important are salt licks and dusting areas. These latter sites have been the source of much controversy in Olympic National Park, where unusual numbers of goats have congregated during recent years.

ISSUES

IV. Wilderness Values

Because of the "rocks and ice" nature of their habitats, mountain goats are inherently relevant in management of several Wilderness Areas. Among these areas are the High Uintas, Lone Peak, Mt. Olympus, Twin Peaks and Mt. Timpanagos. All these areas currently have thrifty populations of goats resulting from transplant efforts. Viewing of goats in these areas is popular, and a highpoint of many wilderness visit traps. This is demonstrated by the overwhelmingly positive reactions generated by wildlife observation cards at popular trailheads.

The "native" or "non native" status of goats in Wilderness Areas is a concern to some publics and locally within some Forest Service offices. This major issue is addressed in Appendix I.

Use of fragile environments by goats in Wilderness Areas is a concern. However, this concern also exists on all public lands, and will be addressed later in a separate section.

Sport hunting of goats in wilderness is an acceptable use of such areas, as is all legal hunting. The position of the Division is that regulated sport hunting is a legitimate recreational and management strategy for goats in Wilderness Areas.

The use of helicopters during transplant projects in Wilderness Areas has been a point of controversy. The Federal Wilderness Act, as well as the Utah Wilderness Act, allow for this activity when specific guidelines are followed (Appendix III). The Division will follow these guidelines in cooperation with the U.S. Forest Service in determining the suitability of helicopter access for transplant projects and for surveys.

Bighorn sheep/goat competition:

Because of their at-least-seasonal overlap in some areas, mountain goats and bighorn sheep would appear to offer some opportunity for competition. However, even where both are present in significant numbers, resource partitioning appears to minimize conflicts. There is enough disparity in site selection, seasonal use and forage preference that overlap is not as significant as would be assumed when each species is considered separately.

In Utah, sympatric sheep and goat populations may be found only in the eastern Uinta Mountains. Here numbers of both species are so low that conflicts on seasonal ranges would be infinitesimally small. This would remain the case through any conceivable increase in the numbers of either species, given the vast amount of summer habitat available. In no other area of the state does potential conflict exist at this time. This is primarily a result of the presence of domestic sheep adjacent to existing goat populations precluding the prospect of bighorn reintroductions, and a general lack of suitable bighorn sheep wintering areas. This will certainly remain the case through the foreseeable future.

Habitat Use:

The effect of mountain goat utilization on available forage resources must be closely monitored. This is especially important given the fragile nature of alpine habitats frequented by goats. Although goat densities are typically low, local areas may exhibit heavier use. It is the mandate of the US Forest Service to monitor areas where goat use of the vegetative resource is a concern. It is critical that careful monitoring be accomplished, since other ungulates use habitats frequented by goats. These include cattle, domestic sheep, deer and elk. Where mountain goat use has been demonstrated to be in excess of that considered appropriate, the Division will cooperate with the Forest Service to manage goat populations to acceptable numbers. Target numbers for individual goat herd units will be generated in herd unit management plans. These will result from public input, cooperation with the Forest Service, and careful monitoring of habitat conditions.

The creation by mountain goats of dust bowls to alleviate heat or ectoparasite load has been identified as a concern. In Olympic National Park, large concentrations of goats have created extensive dusting areas. These goat densities however, have never been observed outside the Park and most probably were a product of unregulated numbers. Under most conditions, goats disturb far less area than that observed in Olympic Park. Where localized disturbance occurs, it may rightly be considered a product of normal goat behavior. Comparable disturbance may be observed at elk wallows and on bighorn sheep lambing and wintering cliffs, even at low population densities. Use of salt blocks or water developments by livestock result in similar disturbance on a much larger scale. If goat numbers are kept within the constraints of forage limitations, use of localized dusting areas should be minimal and a normal part of goat behavior and habitat conditions, common to all goat populations in North America.

Non-consumptive use:

Viewing mountain goats is one of the most exhilarating and memorable experiences available to users of high alpine areas in Utah. Public perception of goat viewing opportunities is overwhelmingly positive. The Division's goal is to foster and promote these opportunities wherever possible. Watchable Wildlife viewing sites should be established at suitable access sites, in compliance with Forest Service standards and guidelines. Information on the availability of goat viewing areas should be disseminated through ongoing I&E programs of both the DWR and the USFS. Conflicts between sport hunters and non-consumptive users should be minimal. Sport hunting is extremely limited, the areas where it occurs are isolated, and hunting seasons are typically well past normal visitor use periods.

"Native" status:

This topic is addressed at length in Appendix II. The position of the Division is that mountain goats were a native species in Utah and are an appropriate and valuable member of the state's biota. Like nearly all ungulates in our human-altered environment, some degree of management must be exercised to preclude unacceptable habitat problems.

V. Management Direction

All goat populations in Utah are the result of transplants occurring since 1967. The Division has had a schedule of desired future transplant sites in place for many years. Included on that list have been:

- a. LaSal Mts (Grand County)
- b. Monroe Mountain (Piute and Sevier Counties)
- c. Mount Naomi (Cache County)
- d. Mount Nebo (Juab County)

With the level of controversy attendant upon goat transplants, however, careful attention must be given to selecting appropriate new release sites. The Division recognizes that not all interest are served by simply maximizing either numbers of populations or numbers of goats within all populations. Each of the above listed areas offers some suitable goat habitat. However, the Division also has an interest in management of wildlife species that recognizes an increased emphasis on ecosystem and landscape level considerations. Not all suitable habitats over time would have had high densities of goats, or any goats at all. It is appropriate then that the Division adopt a position regarding goat management that attempts to address the entire spectrum of goat distributions and abundances within the array of those possible.

Mountain goats are poor pioneers of new habitats. Their distribution within established populations is also decidedly non-random. Some areas traditionally are used consistently, while other nearby areas are used lightly or not at all. This distributional mosaic will, under the proposed management direction, address those whose philosophical paradigm does not include goats in the array of suitable fauna in Utah. The Division will adopt the position that some identified suitable habitats will not receive transplanted goats. Only the Mount Nebo (Juab County) site will remain on the transplant list, the four other sites will be deleted. Additional sites may be added in the future, after habitat evaluation and public involvement processes.

The net result of this management direction will be a landscape wherein some alpine areas have no goats, and some areas within ranges which do support goats will not have goats because of their characteristically non random distribution.

All existing goat populations within the state will be managed with population and/or habitat

objectives. Where possible, goat numbers as determined by suitable survey methods will be monitored. Where this is not feasible, habitat considerations will serve as management objectives.

All such objectives must provide for appropriate goat populations in the context of the entire array of public interests.

This array of management goals will ensure that the interests of hunters and non consumptive users will be served.

Transplanting goats remains a valuable tool in goat management, even outside the context of establishing new population. Given the poor pioneering capabilities of goats, transplants may be used to introduce goats in desirable habitat sites within established herd units. A concurrent goal may be to reduce or stabilize goat numbers in an area from which transplant stock is removed. In either case, such objectives will be identified within individual herd unit management plans.

Individual mountain goat units will have management plans prepared addressing all resource and population objectives.

VI. Harvest Strategy:

The mountain goat is a highly sought after trophy. This is easily demonstrated by the high demand for permits, and the prices realized for bid permits. The trophy value and limited supply will require that permits for goats be strictly limited. This will almost certainly require continuation of a Once-In-A-Lifetime basis for trophy permits. Permit numbers will be determined for individual herd units that will provide for a strong complement of older age class billies within populations. Mountain goats in most established populations exhibit high mortality in young and in older age classes (>8 years). Consequently overharvest is a very real consideration. Permit numbers must therefore be conservative to ensure maintenance of desired numbers and age class distributions.

Morphological differences between older nannies and young billies may be subtle, especially as perceived by the casual observer. This will probably require that trophy permits be issued for any adult goat. An aggressive program of orientation for prospective hunters should be maintained to direct trophy hunters toward adult billies.

As populations reach density, distribution or habitat goals, removal of larger numbers of goats may be necessary. In such cases, strategies for harvest will be adopted that will assure the maintenance of the older age classes of billies. These strategies should be formulated through experimental programs directed at the larger herd units, which are more securely buffered against overharvest. The goal of such programs will be to target non-trophy animals as a population control measure. Suitable strategies will then be incorporated into management plans in other herd units. This may include detailed orientation programs for prospective non-trophy hunts designed to reduce overall population numbers.

Appendix I

MOUNTAIN GOATS IN UTAH: AN OVERVIEW

The Rocky Mountain goat, (*Oreamnos americanus*), as perhaps no other animal, personifies the high lonesome reaches of western North America. Goats are adapted to live in those highest, coldest, snowiest and most precipitous reaches of our classic western mountain ranges. The image of a solitary goat on a ridiculously narrow rock ledge on a seemingly inaccessible cliff is one that once seen is never forgotten. The very elusiveness of the mountain goat, however, has resulted in a situation wherein its history, status, and indeed ecological legitimacy have been the subject of much discussion. It may well be that much of this discussion has been predicated on emotion, conjecture, and a less-than-complete data base. Following is an analysis of information which addresses these issues.

History

The mountain goat of western North America is one of two known members identified from the genus Oreamnos. The closest extant relative is the chamois of Europe. The other member of the genus, Oreamnos harringtoni, is an extinct species.

Because of the harsh sites inhabited by mountain goats, the fossil record is not extensive. Most probably the genus is derived from parent stock originating in Asia, and entering North America sometime during the Pleistocene.

Isolation from that parent stock has been complete since at least the late Pleistocene (18,000 years ago) and perhaps since much before then.

During and since the Pleistocene, the distribution and status of goat populations has varied widely because of its obligate occupancy of only a narrow range of habitats. Tied closely as they are to alpine cliffs, the dramatic changes generated by the ebb and flow of glacial events would have driven suitable habitats up and down the length of mountain ranges in the West. In addition, habitats would have shifted altitudinally within individual mountain ranges. During the full glacial period of the late Pleistocene, Harrington's mountain goats were present far to the south of current mountain goat habitat. This is documented by fossils recovered from the San Josecito Cave site, in Nuevo Leon, Mexico, at an altitude of 2300 meters. At that same time, however, based on current knowledge of the extent of the Cordilleran ice sheet, it is probable that no goats were present in much of Alaska because suitable cliff sites were buried in ice and snow. With the end of the Pleistocene and its full glaciation, suitable habitats would have marched northward and upward from the southern terminus in Mexico. As these habitat changes progressed, Utah would have provided a major pathway for goat redistribution from south to north. The central mountain ranges of Utah, along with the Rocky Mountains of Colorado, would have provided appropriate habitats for goat redistribution in response to changing climate. In fact, the same scenario in reverse would have been expected during the onset

of earlier glacial events as goats moved south to Mexico from their origins in the northern latitudes. A strong case may be made that Utah would have been intermediate between both extremes (north and south) of goat distribution. Given the variety and extent of mountain ranges through the length of the state, habitat at some elevation would have been provided during most if not all of the Pleistocene. Evidence from fossil sites in nearby areas would support that premise. Pleistocene goat remains have been identified from the Smith Creek Cave site on the Utah-Nevada border near Baker, Nevada; at three sites in the Laramie Mountains of southeast Wyoming; and at Rampart Cave and the Stanton site along the Colorado River corridor in northern Arizona. As conditions became warmer and drier in the Intermountain region after the Pleistocene, a dramatic restructuring of goat distributions would have occurred.

Recent Distribution

The distribution of mountain goats at the time of European contact with western mountain ranges is very poorly documented. This may be best understood by looking at the context of goat habitat and the nature of European contact. During climatic periods in existence then (and now) goat habitat would have been provided by only the highest and most inaccessible alpine expanses in the Intermountain region. Only in Alaska and Northwest Canada would goats have been found near the valleys and basins that provided access for Europeans. Even early trappers would have been unlikely to encounter goats in their normal pursuit of beaver, since goats persist yearlong at high elevations in most ranges. And most trappers were certainly uninterested in accurately recording distribution of animal species.

By the early part of this century, however, European settlement and an interest in wildlife had set the stage for increasing recorded knowledge of the status and distribution of goats. By mid-century, a well documented analysis of goat distributions had emerged (Figure I). A Forest Service report from the Wasatch National Forest at the time of the First World War had estimated 25 mountain goats on the Forest. This figure was listed in addition to mountain sheep numbers. The Wasatch Forest at that time also included the Uinta Mountains; site locations, unfortunately, were not listed. A report from a now deceased District Ranger in Kamas stated that both mountain sheep and goats were present in the High Uintas. Nevertheless, by mid-century no native goat populations were known to persist in Utah, Colorado, Nevada, or Wyoming.

Currently, however, there are populations of mountain goats in all these states. All are the result of introductions of goats by state wildlife departments during the last 50 years. Many, if not all, of these populations are apparently healthy and viable. This implies that these populations all occupy suitable habitats that were probably unoccupied or limited at the time of European settlement. Why would this be the case? We will explore a potential explanation for this scenario.

The Intermountain Region Since the Pleistocene

By about 14,000 years ago, the most recent glacial age had ended and the interglacial period that we currently occupy had gained primacy. Conditions had become significantly warmer and in many

cases drier. As we have seen, mountain goat habitat, which once existed as far south as Mexico, would have had to retreat northward and upward to encounter suitable habitat types. However, the progression from full glacial advance to present day conditions was far from linear. As recently as the 1800's, a well documented "Little Ice Age" demonstrated a small scale return to colder and snowier conditions. And during the Middle Holocene, a period of several thousand years (from about 7,000 to 4,500 years ago) persisted when climatic conditions substantially warmer and probably drier than those today predominated in the Intermountain Area. Data indicate this period was pervasive enough that the Great Salt Lake may have been nearly dry.

It would be reasonable to assume that based on our knowledge of goat habitat requirements and climatic conditions in the early Holocene, goats would have found suitable habitat in many mountain ranges of Utah and the Intermountain area after the end of glaciation. These habitats may have been similar to those present today, though perhaps more extensive, given the cooler temperatures. During the Middle Holocene, however, the dramatic warming would have shifted goat habitat much higher on occupied mountain ranges. Data from the Snowbird Bog pollen sites indicate that timberline may have been 1000 feet or more higher in altitude than that found today. Given the observed altitudinal depth of current habitats, this compression would have certainly eliminated suitable sites on most Intermountain ranges, and severely restricted those found in larger and more northerly ranges. It can be easily seen that goat populations surviving after the Pleistocene in those high elevation habitats may have been eliminated or restricted.

Since that period, however, we have seen that conditions have reverted to a cooler and wetter pattern. Suitable goat habitats, as demonstrated by the survival of transplanted populations, exist on many mountain ranges in Utah and surrounding states. If in fact these ranges were devoid of goats at the time of European contact, why had goats not recolonized there? Certainly goat populations had followed the ebb and flow of glacial periods for perhaps millions of years. However, one new factor was inserted at the end of the Pleistocene. Humans had arrived. Humans became for the first time a member of the North American ecosystem. After that time, aboriginal peoples were widespread and important modifiers of both vegetative and animal communities. While the actual extent and type of modifications are still being debated within the scientific community, the conclusion of nearly all recent research has been that impacts by aboriginal peoples were far greater than had been previously thought. Some of the most obvious and dramatic impacts would have been extensive and widespread burning, transportation of propagules of plant species beyond the range of "natural" movement, and manipulation or even elimination of populations and even species of large vertebrates.

It is known that goats were contemporaneous with aboriginal hunters at the end of the Pleistocene. The loss of goats during the Holocene may have been directly aided by opportunistic hunting of goats. It is well documented that native peoples extensively hunted mountain sheep in alpine areas throughout the Intermountain area. Goats would have been an appropriate alternative prey item for these big game hunters.

Whatever the extent of this aboriginal pressure it is obvious that recolonization of suitable habitats

by goats would have had to be accomplished through the barrier of a thriving culture of big game hunters. And these big game hunters would have had the luxury of killing goats opportunistically, since their survival was dependent upon the vast array of other ungulates available to them. Given their highly selective habitat requirements, relatively low densities under any circumstances, and low fecundity, it would be most surprising had goats actually been able to recolonize these now suitable habitats. And currently, with a vast ocean of human handiwork surrounding islands of habitat, the prospects for "natural" establishment of goat populations, except for unoccupied habitats immediately adjacent to existing populations, is exactly zero.

An interesting footnote to this scenario can be added for the current status of moose. This species has since the turn of the century greatly extended its range southward into the Intermountain Area. The prospects for moose pioneering after the Pleistocene would have been essentially as poor as for goats in the face of a thriving big game hunting culture. However, the encroachment of Europeans would have eliminated the two prime predators of moose - wolves and aboriginal big game hunters. And after the turn of the century, wildlife laws and enforcement would have reduced killing by "Europeans". Moose, with their much higher mobility and broader habitat requirements, have been able to colonize areas far to the south of ranges recorded during the 1800's. Mountain goats have not. Interestingly, unlike goats, moose probably are entering the Intermountain Area for the first time. There is no fossil evidence for moose anywhere in the Intermountain Area at any time before European contact. It is likely they were never here. It is just as likely that goats were.

Oreamnos speciation

The relationship between the two known species of Oreamnos (Harringtons goat and the Rocky Mountain goat), warrants some discussion. Essentially, the difference between the two is one of size, (with Harringtons being up to 30% smaller than the existing Rocky Mountain species,) and minor skull variances. This difference is derived from skulls from a few well-documented sites in Arizona, Mexico, California, and Nevada. Overall, though, the fossil record is poor because of the low probability of preservation in the harsh sites frequented by goats. The existing fossils all came from protected cave sites, which are very rare. Nearly all such sites are from isolated areas at the southern extreme of past mountain goat range, and most probably were in areas isolated from other goat populations soon after the end of the Pleistocene. Extreme caution must be exercised in projecting the importance of a character such as relative size in assessing its evolutionary significance and the relationship between the two Oreamnos species. Body size may be one of the most labile of morphological traits, especially in extremes of climatic conditions. Purdue and Reity (1993) have demonstrated tremendous shifts in body size in white tailed deer during the past 4,400 years in Georgia and South Carolina. They consider climate changes with resultant habitat quality to be the driving factor for this change. They indicate that body size tends to be quite responsive to changes in certain environmental factors that in turn serve as the ultimate source of selection. This is dramatically demonstrated by ungulates on islands, which may frequently be dwarfed in response to reduced food resources.

A careful consideration of these factors will generate caution in inferring about the relationship between Harrington and americanus. The fossil records are non-existent between isolated southerly sites and the range of "modern" goats. It is probable that the Harrington population documented by cave sites were "islands" by the late Pleistocene. Kurten (1980) postulates that Harrington's goat was in fact an extension of americanus that became isolated at the end of the Pleistocene, and body size would have been driven by limited resources. While their habits were probably like those of modern goats, they would have been subjected to resource limitations in their peripheral occurrences, and exhibited, perhaps quite rapidly, somewhat reduced body size.

The implications for uncovering the actual history of mountain goats and its relationship to current distribution in Utah are several:

1. Mountain goats almost certainly would have been resident in Utah during numerous appropriate glacial periods. Latitudinal and elevational adjustments would have been made, perhaps many times, during these periods.
2. Absolutely nothing is known of the species of goat that would have inhabited Utah at that time because of a total absence of fossils here and in all other intermediate areas within the Intermountain Area.
3. The species of goat that would have been found in Utah at any given time in the past is probably a moot point. Designation of Harrington's goat as a significant deviation from modern goats may well be an artifact of limited samples from peripheral populations functioning as biological islands at the end of the Pleistocene.
4. "Modern" goats are thriving in a number of mountain ranges in the Intermountain area, indicating that once again suitable habitat is available.
5. Given the overwhelming imprint of man on the modern landscape, there is no chance of goats being able to respond to changes in habitat availability. There probably has been no opportunity since the end of the Pleistocene and the arrival of aboriginal people.

The Division of Wildlife, and the U.S. Forest Service as the land management agency overseeing virtually all suitable habitat, must consider a variety of viewpoints in arriving at appropriate management direction for mountain goats. Goats now inhabit several locations within the state and populations are thriving. The question of whether goats are "natural" or "native" is answerable only as a conceit. The literature and federal guidelines are replete with various definitions of "native". Any definition of "natural" mandates an absolutely arbitrary designation of a point in time - present time, time of European contact, time of aboriginal contact. And it presumes stasis, which is the one condition that surely does not exist, nor has it ever existed. The Division of Wildlife Resources adopts the position that mountain goats are an appropriate species in suitable habitats within Utah. As with any ungulate species, proactive management is obligatory in a landscape unalterably touched by man. Careful management of the species is mandated by its requisite occupancy of fragile alpine

environments. However, the benefits to accrue from the presence of such a magnificent animal are enormous. Mountain goats provide a unique addition to the biota of our state, and are an inspiration to those who know them or know of them. They are and should continue to be a valued part of our wildlife resource.

Appendix II

Existing Utah Mountain Goat Populations

<u>Area</u>	<u>Established</u>	<u>Current</u>	<u>Number and Status</u>
Lone Peak	1967	200	Stable
Mt. Olympus	1981	20	Stable
Mt. Timpanogos	1981	100	Stable
Provo Peak	1989	25	Increasing
Tushar	1986	60	Increasing
Box Elder Peak	1967	40	Stable
Uinta Mtn (Bald Mtn)	1987	30+	Increasing
(White Rocks)	1988	25+	Increasing
Willard Peak	1994	6	

Appendix III

Objective	Strategy
1. Establish mountain goats in suitable habitats within the state.	<p>Assess desirability of any future transplants whether into new areas, or to augment or redistribute existing population, in cooperation with US Forest Service and the public.</p> <p>Pursue necessary authorization to implement any identified transplant needs.</p>
2. Manage established goat populations to protect desired habitat conditions.	<p>Work cooperatively with Forest Service to monitor habitat and to define desired habitat conditions.</p> <p>Establish herd unit objectives based on population and habitat data.</p> <p>Utilize transplants and non-trophy permits to adjust numbers within herd units.</p>
3. Manage established goat populations to maintain older age classes of males.	<p>Balance conservative trophy permits and appropriate non-trophy permits to protect older-aged males from overharvest.</p> <p>Develop an effective orientation program to allow non-trophy harvest for population manipulation purposes.</p>
4. Promote acceptance of goats by non-hunting public.	<p>Utilize various media formats and aggressive on-site interpretive programs to educate non-consumptive public to the value of goats in appropriate areas.</p>
5. Promote acceptance of goats by Forest Service.	<p>Work closely with Forest Service personnel in implementing herd unit management plans and in developing Forest Service policy toward goats.</p> <p>Demonstrate the Divisions interest in and intent to set appropriate population and habitat goals and to manage to those goals.</p>